What is claimed is:

1. A disaster risk assessment system comprising a function that compares a function-losing event occurrence frequency and a direct loss amount such as a facility loss amount in current equipment with a function-losing event occurrence frequency and a direct loss amount such as a facility loss amount after taking equipment measures for presenting decision-making information on equipment measures, based on input data on an event tree branch item sequence, an initial event occurrence frequency, information on a response to a target facility when an event occurs in current equipment and multiple pieces of counter-disaster equipment of an event tree target facility, an event occurrence time damage probability, a mission time, a conditional failure probability, and a cost of current equipment and counter-disaster equipment of an event target facility.

2. The disaster risk assessment system according to claim 1, further comprising a function that assesses a difference between a sum of the direct loss amount and a business value loss amount at disaster time in the current equipment and a sum of the direct loss amount and a business value loss amount at disaster time in the counter-disaster equipment after taking disaster measures and compares the difference with a disaster measures equipment cost for presenting decision making information on disaster measures.

3. The disaster risk assessment system according to claim 1, further comprising a function that compares a sum of a casualty insurance premium against a disaster and a disaster measures equipment cost in the current equipment with a sum of a casualty insurance premium against a disaster and a disaster measures equipment cost in the counter-disaster equipment after disaster measures are taken for presenting decision making information on disaster measures.

4. The disaster risk assessment system according to claim 1, further comprising a function that compares a total cost, which is generated by subtracting an insurance amount at disaster time from a sum of the direct loss amount at disaster time, disaster measures equipment cost, disaster measures management cost, suspension-causing a business value loss amount at disaster time, and casualty insurance premium against a disaster in the current equipment, with a total cost, which is generated by subtracting an insurance amount at disaster time from a sum of the direct loss amount at disaster time, disaster measures equipment cost, disaster measures management cost, suspension-causing a business value loss amount at disaster time, and casualty insurance premium against a disaster in the counter-disaster equipment after disaster measures are taken, for presenting decision making information on disaster measures.

5. The disaster risk assessment system according to claim 2 wherein said business value loss amount is a business value

loss amount assessed considering a time-based decrease in a market share due to a suspension and a restart from the suspension.

6. The disaster risk assessment system according to claim 5 wherein said business value loss amount is assessed from a difference between a current value of a total future profit or a total cash flow obtained from the business when a suspension occurs and a current value of a total future profit or a total cash flow expected when no suspension occurs.

7. The disaster risk assessment system according to claim 5, further comprising a function that assesses a business value loss amount expected value of a disaster based on occurrence probabilities of a plurality of loss events assessed by an event tree of loss events created for the disaster and on a suspension-causing business value loss amount generated corresponding to said event tree and said plurality of loss events.

8. The disaster risk assessment system according to claim 7 wherein said plurality of loss events are rearranged in descending order of occurrence probabilities thereof and said business value loss amount expected value of a disaster is assessed according to an expression given below using the suspension-causing business value loss amount generated corresponding to said plurality of loss events,

$$V = \sum_{k=0}^{n} p_k \Delta v_k$$

where,

V: Expected value of suspension-causing business value loss amount

n: No. of assumed loss events

p_k: Occurrence probability of k-th loss event ($p_k \leq P_{k-1}$, K=1, 2, ..., n)

$\Delta v_0 = v_0$

$\Delta v_k = v_k - v_{k-1}$ ($v_k \geq v_{k-1}$, k=1, 2, ... , n)

$\Delta v_k = 0$ ($v_k < v_{k-1}$, k=1, 2, ... , n)

v_k : Business value loss amount for k-th loss event

9. A disaster risk assessment system comprising:

a data entry unit that receives data on an assumed disaster event, a relation between an assumed disaster occurrence frequency and a disaster scale, event tree information, equipment data on a target facility that is an event tree branch item, response analysis information on equipment of a target facility for a disaster event, degree-of-damage information on equipment of a target facility, an equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, deductible or maximum amount or premium data on casualty insurance of a target facility, alternate equipment data on a target facility that is an event tree branch item, response analysis information on alternate equipment of a target facility for a disaster event, degree-of-damage information on alternate equipment of a target facility, an alternate equipment

reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, and a deductible or maximum amount or premium of casualty insurance of a target facility when alternate equipment is installed;

a hazard curve estimation unit that gives a disaster hazard curve of a target district;

an occurrence frequency assessment unit that assesses an occurrence frequency of a disaster event based on said disaster hazard curve;

a target part response assessment unit that assesses a response acceleration of a target part using an acceleration amplification coefficient for each target part of a target building;

a target facility failure rate estimation unit that calculates a target facility failure rate of an event tree branch event item based on an assessment result of said target part response assessment unit;

a disaster loss amount assessment unit that assesses a damage probability, a direct loss amount, and a suspension-causing business value loss amount of a corresponding damage mode by classifying a damage mode after the occurrence of a disaster based on event tree information;

a direct loss amount expected value calculation unit that calculates a direct loss amount expected value by calculating a total of products of the damage probability and the direct loss amount of the damage modes;

a business value loss amount expected value estimation unit that calculates a business value loss amount expected

value by calculating a total of products of the damage probability and the business value loss amount of the damage modes; and

an information presentation unit that presents decision making information on disaster measures by comparing a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in current equipment with a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in counter-disaster equipment after disaster measures are taken,

wherein said disaster loss amount assessment unit uses a direct loss amount, from which a casualty insurance compensation determined by a casualty insurance deductible and maximum amount is deducted, as the direct loss amount, and

wherein said direct loss amount expected value calculation unit uses a direct loss amount expected value, from which a casualty insurance compensation determined by a casualty insurance deductible and maximum amount is deducted, as the direct loss amount expected value.

10. The disaster risk assessment system according to claim 9 wherein said direct loss amount includes an operating loss amount, wherein said operating loss amount is an operating loss amount from which a business casualty insurance

compensation determined by a business casualty insurance deductible and maximum amount is deducted, and wherein an operating loss amount expected value is an operating loss amount expected value from which the business casualty insurance compensation determined by the business casualty insurance deductible and maximum amount is deducted.

11. The disaster risk assessment system according to claim 9 wherein said direct loss amount includes an equipment loss amount, wherein said equipment loss amount is an equipment loss amount from which an equipment casualty insurance compensation determined by an equipment casualty insurance deductible and maximum amount is deducted, and wherein an equipment loss amount expected value is an equipment loss amount expected value from which the equipment casualty insurance compensation determined by the equipment casualty insurance deductible and maximum amount is deducted.

12. The disaster risk assessment system according to claim 9 wherein said casualty insurance premium determined by said casualty insurance deductible and maximum amount is assessed.

13. The disaster risk assessment system according to claim 9 wherein said business value loss amount is a business value loss amount including a profit and loss of a time-based decrease in a market share due to a suspension and a restart of business.

14. The disaster risk assessment system according to claim 13 wherein said business value loss amount is assessed from a difference between a current value of a total future profit or a total cash flow obtained from the business when a suspension occurs and a current value of a total future profit or a total cash flow expected when no suspension occurs.

15. The disaster risk assessment system according to claim 13, wherein a business value loss amount expected value of a disaster is assessed based on occurrence probabilities of a plurality of loss events obtained from event tree information on loss events created for the disaster and on a suspension-causing business value loss amount generated corresponding to said event tree information and said plurality of loss events.

16. The disaster risk assessment system according to claim 15 wherein said plurality of loss events are rearranged in descending order of occurrence probabilities, wherein a difference between the business value loss amount of a particular loss event and the business value loss amount of a loss event in a level immediately preceding the particular loss event is compared with 0, and wherein a total sum of amounts, each generated by multiplying the difference greater than 0 by the occurrence probability of the particular loss event, and an amount generated by multiplying the business value loss amount of a highest-occurrence-probability loss event by the

occurrence probability thereof is established as the business value loss amount expected value of the disaster.

17. A disaster risk assessment support method causing a computer to assess a difference between a sum of a direct loss amount and a business value loss amount at disaster time in current equipment and a sum of a direct loss amount and a business value loss amount at disaster time in counter-disaster equipment after taking disaster measures and to compare the difference with a disaster measures equipment cost for presenting decision making information on disaster measures.

18. The disaster risk assessment support method according to claim 17, said method further causing the computer to compare a sum of a casualty insurance premium against a disaster and a disaster measures equipment cost in the current equipment with a sum of a casualty insurance premium against a disaster and a disaster measures equipment cost in the counter-disaster equipment for presenting decision making information on disaster measures.

19. The disaster risk assessment support method according to claim 17, said method further causing the computer to compare a total cost, which is generated by subtracting an insurance amount at disaster time from a sum of the direct loss amount at disaster time, disaster measures equipment cost, disaster measures management cost, suspension-causing

business value loss amount at disaster time, and a casualty insurance premium against a disaster in the current equipment, with a total cost, which is generated by subtracting an insurance amount at disaster time from a sum of the direct loss amount at disaster time, disaster measures equipment cost, disaster measures management cost, suspension-causing business value loss amount at disaster time, and a casualty insurance premium against a disaster in the counter-disaster equipment after disaster measures are taken, for presenting decision making information on disaster measures.

20. A disaster risk assessment support method causing a computer to perform the steps of:

receiving data on an assumed disaster event, a relation between an assumed disaster occurrence frequency and a disaster scale, event tree information, equipment data on a target facility that is an event tree branch item, response analysis information on equipment of a target facility for a disaster event, degree-of-damage information on equipment of a target facility, an equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, deductible or maximum amount or premium data on casualty insurance of a target facility, alternate equipment data on a target facility that is an event tree branch item, response analysis information on alternate equipment of a target facility for a disaster event, degree-of-damage information on alternate equipment of a target facility, an alternate equipment reconstruction cost of a target facility, a number

of days for recovery, an operating loss amount, and a deductible or maximum amount or premium of casualty insurance of a target facility when alternate equipment is installed;

giving a disaster hazard curve of a target district;

assessing an occurrence frequency of a disaster event based on said disaster hazard curve;

assessing a response acceleration of a target part using an acceleration amplification coefficient for each target part of a target building;

calculating a target facility failure rate of an event tree branch event item based on an assessment result of said step of assessing a response acceleration of a target part;

assessing a damage probability, a direct loss amount, and a suspension-causing business value loss amount of a corresponding damage mode by classifying a damage mode after the occurrence of a disaster based on event tree information;

calculating a direct loss amount expected value by calculating a total of products of the damage probability and the direct loss amount of the damage modes;

calculating a business value loss amount expected value by calculating a total of products of the damage probability and the business value loss amount of the damage modes; and

presenting decision making information on disaster measures by comparing a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in current equipment with a function-losing event occurrence frequency, a direct loss

amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in counter-disaster equipment after disaster measures are taken,

wherein said step of assessing a disaster loss amount uses a direct loss amount, from which a casualty insurance compensation determined by a casualty insurance deductible and maximum amount is deducted, as the direct loss amount, and

wherein said step of calculating a direct loss amount expected value uses a direct loss amount expected value, from which a casualty insurance compensation determined by a casualty insurance deductible and maximum amount is deducted, as the direct loss amount expected value.

21. The disaster risk assessment support method according to claim 20 wherein said direct loss amount includes an operating loss amount, wherein said operating loss amount is an operating loss amount from which a business casualty insurance compensation determined by a business casualty insurance deductible and maximum amount is deducted, and wherein an operating loss amount expected value is an operating loss amount expected value from which the business casualty insurance compensation determined by the business casualty insurance deductible and maximum amount is deducted.

22. The disaster risk assessment support method according to claim 20 wherein said direct loss amount includes

an equipment loss amount, wherein said equipment loss amount is an equipment loss amount from which an equipment casualty insurance compensation determined by an equipment casualty insurance deductible and maximum amount is deducted, and wherein an equipment loss amount expected value is an equipment loss amount expected value from which the equipment casualty insurance compensation determined by the equipment casualty insurance deductible and maximum amount is deducted.

23. The disaster risk assessment support method according to claim 20, said method causing the computer to assess said casualty insurance premium determined by said casualty insurance deductible and maximum amount.

24. The disaster risk assessment support method according to claim 20 wherein said business value loss amount is a business value loss amount including a profit and loss of a time-based decrease in a market share due to a suspension and a restart of business.

25. The disaster risk assessment support method according to claim 24, said method causing the computer to assess said business value loss amount from a difference between a current value of a total future profit or a total cash flow obtained from the business when a suspension occurs and a current value of a total future profit or a total cash flow expected when no suspension occurs.

26. The disaster risk assessment support method according to claim 24, said method causing the computer to assess a business value loss amount expected value of a disaster based on occurrence probabilities of a plurality of loss events obtained from event tree information on loss events created for the disaster and on a suspension-causing business value loss amount generated corresponding to said event tree information and said plurality of loss events.

27. The disaster risk assessment support method according to claim 26, said method causing the computer to rearrange said plurality of loss events in descending order of occurrence probabilities; to compare a difference between the business value loss amount of a particular loss event and the business value loss amount of a loss event in a level immediately preceding the particular loss event with 0; and to establish a total sum of amounts, each generated by multiplying the difference greater than 0 by the occurrence probability of the particular loss event, and an amount, generated by multiplying the business value loss amount of a highest-occurrence-probability loss event by the occurrence probability thereof, as the business value loss amount expected value of the disaster.

28. A disaster risk assessment system comprising:

a data entry unit that receives data on an assumed disaster event, a relation between an assumed disaster occurrence frequency and a disaster scale, event tree

information, equipment data on a target facility that is an event tree branch item, response analysis information on equipment of a target facility for a disaster event, degree-of-damage information on equipment of a target facility, an equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, deductible or maximum amount or premium data on casualty insurance of a target facility, alternate equipment data on a target facility that is an event tree branch item, response analysis information on alternate equipment of a target facility for a disaster event, degree-of-damage information on alternate equipment of a target facility, an alternate equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, and a deductible or maximum amount or premium of casualty insurance of a target facility when alternate equipment is installed;

a hazard curve estimation unit that gives a disaster hazard curve of a target district;

an occurrence frequency assessment unit that assesses an occurrence frequency of a disaster event based on said disaster hazard curve;

a target part response assessment unit that assesses a response acceleration of a target part using an acceleration amplification coefficient for each target part of a target building;

a target facility failure rate estimation unit that calculates a target facility failure rate of an event tree branch event item based on an assessment result of said target

part response assessment unit;

a disaster loss amount assessment unit that assesses a damage probability, a direct loss amount, and a suspension-causing business value loss amount of a corresponding damage mode by classifying a damage mode after the occurrence of a disaster based on event tree information;

a direct loss amount expected value calculation unit that calculates a direct loss amount expected value by calculating a total of products of the damage probability and the direct loss amount of the damage modes;

a business value loss amount expected value estimation unit that calculates a business value loss amount expected value by calculating a total of products of the damage probability and the business value loss amount of the damage modes; and

an information presentation unit that presents decision making information on disaster measures by comparing a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in current equipment with a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in counter-disaster equipment after disaster measures are taken,

wherein said business value loss amount expected value estimation unit calculates said business value loss amount expected value based on a probability distribution of a

business profit or a cash flow.

29. The disaster risk assessment system according to claim 28 wherein said business value loss amount expected value estimation unit assesses a disaster measures effect based on the probability distribution of a business profit or a cash flow and causes said information presentation unit to present the disaster measures effect, wherein the disaster measures effect is a value generated by subtracting a sum of a business value loss amount expected value assessed assuming that disaster measures will be taken and a total cost for taking disaster measures from a business value loss amount expected value assessed in a current business environment in which no disaster measures is taken.

30. The disaster risk assessment system according to claim 28 wherein said business value loss amount expected value estimation unit assesses a real option value and causes said information presentation unit to present the real option value, wherein a property value is a value generated by subtracting a business value loss amount expected value assessed assuming that disaster measures will be taken from a business value loss amount expected value assessed in a current business environment in which no disaster measures is taken, a volatility is a standard deviation of a variation in a business profit or a cash flow per unit time, an exercise price is a total cost for taking disaster measures, and an expiration is a period to a time when disaster measures are taken.

31. The disaster risk assessment system according to claim 28, further comprising a function that assesses the operating loss amount and the business value loss amount of each business unit within a business establishment for which disaster risk assessment is made and presents the assessment value of each business unit and a total of all business units.

32. A disaster risk assessment system comprising:

a data entry unit that receives data on an assumed disaster event, a relation between an assumed disaster occurrence frequency and a disaster scale, event tree information, equipment data on a target facility that is an event tree branch item, response analysis information on equipment of a target facility for a disaster event, degree-of-damage information on equipment of a target facility, an equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, deductible or maximum amount or premium data on casualty insurance of a target facility, alternate equipment data on a target facility that is an event tree branch item, response analysis information on alternate equipment of a target facility for a disaster event, degree-of-damage information on alternate equipment of a target facility, an alternate equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, and a deductible or maximum amount or premium of casualty insurance of a target facility when alternate equipment is installed;

a hazard curve estimation unit that gives a disaster hazard curve of a target district;

an occurrence frequency assessment unit that assesses an occurrence frequency of a disaster event based on said disaster hazard curve;

a target part response assessment unit that assesses a response acceleration of a target part using an acceleration amplification coefficient for each target part of a target building;

a target facility failure rate estimation unit that calculates a target facility failure rate of an event tree branch event item based on an assessment result of said target part response assessment unit;

a disaster loss amount assessment unit that assesses a damage probability, a direct loss amount, and a suspension-causing business value loss amount of a corresponding damage mode by classifying a damage mode after the occurrence of a disaster based on event tree information;

a direct loss amount expected value calculation unit that calculates a direct loss amount expected value by calculating a total of products of the damage probability and the direct loss amount of the damage modes;

a business value loss amount expected value estimation unit that calculates a business value loss amount expected value by calculating a total of products of the damage probability and the business value loss amount of the damage modes; and

an information presentation unit that presents decision

making information on disaster measures by comparing a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in current equipment with a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in counter-disaster equipment after disaster measures are taken,

wherein said business value loss amount expected value estimation unit assesses said operating loss amount expected value based on a probability distribution of a business profit or a cash flow.

33. The disaster risk assessment system according to claim 32 wherein a disaster measures effect is assessed and presented based on the probability distribution of a future business profit or a cash flow, wherein the disaster measure effect is a value generated by subtracting a sum of an operating loss amount expected value assessed assuming that disaster measures will be taken and a total cost for taking disaster measures from an operating loss amount expected value assessed in a current business environment in which no disaster measures is taken.

34. The disaster risk assessment system according to claim 32 wherein a real option value is assessed, wherein a property value is a value generated by subtracting an operating

loss amount expected value assessed assuming that disaster measures will be taken from an operating loss amount expected value assessed in a current business environment in which no disaster measures is taken, a volatility is a standard deviation of a variation in a business profit or a cash flow per unit time, an exercise price is a total cost for taking disaster measures, and an expiration is a period to a time when disaster measures are taken.

35. The disaster risk assessment system according to claim 32, further comprising a function that assesses the operating loss amount and the business value loss amount of each business unit within a business establishment for which disaster risk assessment is made and presents the assessment value of each business unit and a total of all business units.

36. A disaster risk assessment service providing system comprising:

input means for receiving a user-desired calculation condition, sent from a user terminal via a network, for input to said system;

the disaster risk assessment system according to claim 28 that calculates at least one disaster risk assessment value based on the user-desired calculation condition received by said input means; and

output means for sending a disaster risk assessment value, calculated by said disaster risk assessment system, to said user terminal.

37. A disaster risk assessment service providing system comprising:

input means for receiving a user-desired calculation condition, sent from a user terminal via a network, for input to said system;

the disaster risk assessment system according to claim 32 that calculates at least one disaster risk assessment value based on the user-desired calculation condition received by said input means; and

output means for sending a disaster risk assessment value, calculated by said disaster risk assessment system, to said user terminal.

38. A disaster risk assessment method comprising the steps of:

receiving data on an assumed disaster event, a relation between an assumed disaster occurrence frequency and a disaster scale, event tree information, equipment data on a target facility that is an event tree branch item, response analysis information on equipment of a target facility for a disaster event, degree-of-damage information on equipment of a target facility, an equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, deductible or maximum amount or premium data on casualty insurance of a target facility, alternate equipment data on a target facility that is an event tree branch item, response analysis information on alternate equipment of a target

facility for a disaster event, degree-of-damage information on alternate equipment of a target facility, an alternate equipment reconstruction cost of a target facility, a number of days for recovery, an operating loss amount, and a deductible or maximum amount or premium of casualty insurance of a target facility when alternate equipment is installed;

obtaining a disaster hazard curve of a target district;

assessing an occurrence frequency of a disaster event based on said disaster hazard curve;

assessing a response acceleration of a target part using an acceleration amplification coefficient for each target part of a target building;

calculating a target facility failure rate of an event tree branch event item based on an assessment result of said step of assessing a response acceleration of a target part;

assessing a damage probability, a direct loss amount, and a suspension-causing business value loss amount of a corresponding damage mode by classifying a damage mode after the occurrence of a disaster based on event tree information;

calculating a direct loss amount expected value by calculating a total of products of the damage probability and the direct loss amount of the damage modes;

calculating a business value loss amount expected value by calculating a total of products of the damage probability and the business value loss amount of the damage modes; and

presenting decision making information on disaster measures by comparing a function-losing event occurrence frequency, a direct loss amount expected value, a disaster

measures cost, a business value loss amount expected value, and a casualty insurance premium in current equipment with a function-losing event occurrence frequency, a direct loss amount expected value, a disaster measures cost, a business value loss amount expected value, and a casualty insurance premium in counter-disaster equipment after disaster measures are taken,

wherein a disaster measures effect is assessed based on the probability distribution of a business profit or a cash flow, wherein the disaster measure effect is a value generated by subtracting a sum of a business value loss amount or an operating loss amount expected value assessed assuming that disaster measures will be taken and a total cost for taking disaster measures from a business value loss amount or an operating loss amount expected value assessed in a current business environment in which no disaster measures is taken.

39. A disaster risk assessment service providing method comprising the steps of:

receiving a user-desired calculation condition, sent from a user terminal via a network, for input;

calculating at least one disaster risk assessment value, using the disaster risk assessment system according to claim 28, based on the user-desired calculation condition that is received; and

sending the calculated disaster risk assessment value to said user terminal.